



**US EPA OECA
AIR INSPECTION REPORT**

FRS #: NA Inspection Dates: **September 26-29, 2016**
AFS #: NA
Inspection Type: Clean Air Act, Partial Compliance Evaluation
Company Name: **CHESAPEAKE OPERATING, LLC**
Facility Name: **CHESAPEAKE OPERATING, LLC, VARIOUS EAGLE FORD SITES**
Physical Location: *Several Facilities*
Mailing Address: P. O. Box 18496, Oklahoma City, OK 73154
Counties: **DIMITT, MCMULLEN and LA SALLE COUNTIES**
Reg. Programs: **SIP and NSPS**
SIC Code: **1311 Crude Petroleum and Natural Gas**

Facility Representatives:

Vijay K. Kurki, PE	Manager-Environmental	210-492-1027
Charles Sholz	Production Supervisor	Not Provided
Levi Poe	Environmental Rep-Air	405-935-7866
Chris Sanchez	Environmental Rep-Air	210-492-1027

EPA Inspectors:

Daniel Hoyt	Environmental Engineer	202-564-7898
Constantinos Loukeris	Environmental Engineer	312-353-6198

EPA Inspector:

Daniel Hoyt
Daniel Hoyt, Environmental Engineer

7/6/17
(Date)

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SECTION 1 – PURPOSE OF THE INSPECTION

The US Environmental Protection Agency (EPA) inspection team, including EPA Office of Enforcement and Compliance Assistance (OECA), Air Enforcement Division (AED) inspector Daniel Hoyt, and EPA Region 5, Air Enforcement and Compliance Assurance inspector Constantinos Loukeris, arrived at the offices of the Chesapeake Operating, LLC (Chesapeake) located at 4350 Lockhill Selma Road, Suite 250, Shavano Park, TX 78249 at 9:00 AM on September 26, 2016, for a previously arranged entry meeting.

Daniel Hoyt and Constantinos Loukeris presented their inspector credentials to Vijay K. Kurki, PE, Manager-Environmental, of Chesapeake Energy Corporation. The EPA inspection team met with representatives from Chesapeake, including: Mr. Kurki, Billie J Pettis, Supervisor-Health and Safety, Samuel W. Frydenlund, Supervisor-Field Engineering, Chris Sanchez, Environmental Representative II, Joe Benavides, Operations Manager, and Levi Poe, Environmental Representative-Air.

Daniel Hoyt informed the Chesapeake representatives that the purpose of the EPA inspections was to evaluate the compliance status of oil and gas production facilities in the Eagle Ford Shale with applicable requirements of the Clean Air Act (CAA). The scope of each inspection was a partial compliance evaluation (PCE) including evaluation of the compliance status of the facility with applicable CAA regulations, including New Source Performance Standards, and Texas State Implementation Plan (SIP) regulations. The primary objectives were for the EPA inspectors to evaluate on-site conditions, and conduct emissions surveys at production facilities in McMullen, Dimmit and La Salle counties. Mr. Pettis provided the EPA inspection team with a safety briefing.

SECTION 2 – GENERAL FACILITY DESCRIPTION

The EPA inspection team visited 21 Chesapeake facility locations in McMullen, Dimmit and La Salle counties of Texas. The following process descriptions are based on Daniel Hoyt's inspection observations, information provided by the Chesapeake representatives during the inspections and air permitting application information, provided by Mr. Kurki during the exit meeting on September 30, 2016. Chesapeake claims that the air permitting application information provided (included as Attachment 1) contains confidential business information (CBI).

In general, the 21 facilities that were visited receive comingled fluids consisting of crude oil, produced water, and natural gas from wells located in the area. These raw products upon entering the facility are routed to a separator, where the gas is separated from the liquids and routed to the sales pipeline. The liquids from the separator are then routed to a heater treater. Water is separated from the crude oil in the heater treater and is routed to produced water tanks. The crude oil from the heater treater flows to a flash tower. A portion of the gases from the heater treater are used as fuel for the heater treater, while the remainder is routed to a flare. Gases collected from the flash tower are also routed to a flare, and the remaining crude oil is transported to crude oil tanks. Vapors from the crude oil and produced water storage tanks are routed to a flare via a common header. The crude oil and produced water are loaded into trucks for removal from the site. Some site specific differences from the general process described above are as follows:

- Natural gas generators are used to provide equipment power because access to the electric grid is not available, except at Garcia A Pad, JEA Central Production Facility (CPF), and Shining Star Ranch I Pad where grid power is used;
- The JEA Central Facility is equipped with an emergency generator for backup power;
- The flash towers at JEA B Pad, Rogers B Pad and Rogers C Pad may not be used at times;
- The gas from the separator at the JEA CPF may be routed to the flares;
- The JEA CPF and Valley Wells CPF Pad have gunbarrel skim tanks that skim oil from the water coming from the heater treaters. The water flows from the gunbarrel skim tanks to the water tanks and the skimmed oil flows to slop oil tanks, where it is comingled with other liquids collected at the site, e.g. from the flare knockout pots. The slop oil is pumped back to the heater treaters for further separation. Vapors from the slop oil and gunbarrel tanks are routed to the flare;
- At the JJ Henry CPF slop oil from the flare knockout and various drips flows into slop oil tanks, controlled by the flares, before being pumped back to the heater treaters for further separation;
- Vapors from the tanks and heater treaters may be captured via electric vapor recovery compressors and sent to the sales line at the JEA CPF, the Valley Wells CPF Pad and the JJ Henry CPF;
- The flash off the heater treaters and flash towers may be captured via electric vapor recovery compressors and sent to the sales line at the Prince MCM M Pad CPF and Shining Star Ranch F CPF;
- Under normal conditions, oil is pumped from the crude oil tanks into the pipeline at the JEA CPF;
- Gas from the separator is used as fuel for the heater treater instead of gas from the heater treater at the JJ Henry Central Facility and the Valley Wells CPF Pad;
- At times all gas is flared and none is sent to the sales line at the Valley Wells CPF Pad; and
- There is an oil well pump jack engine that is fueled by natural gas at the Shining Star I Pad.

SECTION 3 – SITE VISITS

All emissions surveys were conducted by the EPA inspection team using the following equipment:

- Infrared (IR) camera manufactured by FLIR, Model GF-320, serial number 44401137. All optical gas imaging was conducted by Constantinos Loukeris. IR camera surveys of emissions sources were generally first conducted first in high sensitivity mode (HSM) for screening purposes, and then in full automatic mode (auto).
- Constantinos Loukeris used the FLIR GF-320 IR camera, and digital cameras to take photographs in visible light.
- Constantinos Loukeris used a PID manufactured by Ion Science, PhoCheck Tiger, serial number T-106543 with a 10.6 eV lamp to survey the plant for emissions of volatile organic compounds (VOC). The PID was calibrated with isobutylene, and is capable of detecting VOC as low as 1 ppb, depending on the gas.
- Daniel Hoyt used a QRAE3 4-gas meter by RAE Systems (serial number M02A007124) for safety screening of hydrogen sulfide concentrations, oxygen concentration deficiencies and lower explosive levels (LELs).

A log of all photographs taken and videos recorded, location coordinates, dates and times, significant PID data and other observations are included as Attachment 2. Chesapeake's permit by rule and standard permit approval letters from the Texas Commission on Environmental Quality (TCEQ) and the associated applications, which include information claimed by Chesapeake to be confidential business information (CBI), are included digitally on a compact disk (CD) as Attachment 1. Attachment 3 is a photo log that includes all photographs taken during the site visits. Attachment 4 is a CD with all of the original videos and photographs taken during the site visits.

During the afternoon of September 26, 2016, the EPA inspection team was accompanied by Charles Sholz, Vijay Kurki and Levi Poe, and performed in-depth facility tours and field emissions surveys at JJ Henry CPF, Prince M Pad CPF and Prince K Pad. Ambient temperatures were around 80-85°F, the sky was overcast to mostly cloudy, and the winds were northeasterly, 5-10 mph.

At the JJ Henry CPF:

- Daniel Hoyt and Constantinos Loukeris both observed visible emissions (smoke) coming from Flares F1 and F2. The flares had more than 5 minutes of visible emissions in a two-hour period. Daniel Hoyt and Constantinos Loukeris continuously observed the flares from 1:00 pm until 1:18 pm, and during that time period the flares had visible emissions the entire time. Daniel Hoyt and Constantinos Loukeris did not observe the JJ Henry CPF flares without visible emissions during the entire JJ Henry CPF site visit, which lasted from 12:58 pm until 2:02 pm. Constantinos Loukeris recorded visible light video MVI 1023 and IR video MOV 1352, and took photograph IMG 1024, which depict Flares F1 and F2 while they had visible emissions.
- Constantinos Loukeris detected significant emissions leaks from the three crude oil tanks' thief hatches using the IR camera and confirmed the leaks with the PID. Constantinos Loukeris recorded IR videos MOV 1354, MOV 1356 and MOV 1357, which depict the crude oil tanks' thief hatch leaks.
- Constantinos Loukeris detected significant emissions leaks from a crude oil tank's thief hatch and relief valve using the IR camera. Daniel Hoyt observed and noted visible staining around the thief hatch, but Constantinos Loukeris was not able to confirm the leaks with the PID

because wasp nests were observed. Constantinos Loukeris recorded an IR video MOV 1358, which depicts the crude oil tank's thief hatch and relief valve leaks.

- Constantinos Loukeris detected significant emissions leaks from a produced water tank's thief hatch using the IR camera, but was not able to confirm the leaks with the PID because wasp nests were observed. Constantinos Loukeris recorded an IR video MOV 1359, which depicts the produced water tank's thief hatch leak.
- Constantinos Loukeris detected emissions leaks from the thief hatches on six produced water tanks and two crude oil tanks but he was not able to further examine or confirm the leaks with the PID because wasp nests were observed. Constantinos Loukeris recorded IR videos MOV 1360 and MOV 1355, which depict the thief hatch leaks from the six produced water tanks and two crude oil tanks respectively.

At the Prince M Pad CPF:

- Constantinos Loukeris and Daniel Hoyt both observed that the two M Pad oil well pump jacks were not operating. Charles Sholz explained that the M Pad oil well pump jacks were not working because the wells were shut in due to a generator power outage.
- Constantinos Loukeris detected significant emissions leaks from relief valves and vacuum breakers on the vent lines above three crude oil tanks, and from the three crude oil tanks' thief hatches and relief valves, and from bubbles emanating from a bolt near the thief hatch on two of the crude oil tanks using the IR camera, and confirmed the leaks from the three crude oil tanks' thief hatches with the PID. Constantinos Loukeris recorded IR videos MOV 1361, MOV 1362, MOV 1363, MOV 1365 and MOV 1366, which depict the leaks from the relief valves and vacuum breakers on the vent lines above the three crude oil tanks and from the three crude oil tanks' thief hatches and relief valves.
- At around 3:12 pm Constantinos Loukeris and Daniel Hoyt both observed a release from the relief valves on the vent lines above three crude oil tanks, as we both noted hissing and gurgling noises, and dripping, coming from the three vent line relief valves. Constantinos Loukeris recorded IR video MOV 1364, which depicts the release from the three relief valves on the vent line above the crude oil tanks. Charles Sholz explained that the release was the result of produced water being removed from one of the produced water tanks. Mr. Sholz explained that emissions from the displaced head space in the tank truck were routed back to the head space of the produced water tank via vapor balance. The head spaces of the produced water tanks and the crude oil tanks are interconnected, and the emissions from the produced water tank truck loading released from the vent line relief valves above the three crude oil tanks because the tank vent lines were shut in and the flare was not controlling emissions from the tanks due to the generator power outage. Constantinos Loukeris requested the emissions calculations and records for the release from the three relief valves on the vent lines above the crude oil tanks. Constantinos Loukeris and Daniel Hoyt, and the accompanying Chesapeake personnel climbed down from the tanks during the release from the vent line relief valves as a safety precaution.
- No emission leaks were detected by Constantinos Loukeris with the IR camera or the PID, from the relief valves and thief hatches on three crude oil tanks, or from the thief hatches on two process water tanks.
- Constantinos Loukeris detected significant emissions leaks from a crude oil tank's thief hatch and relief valves using the IR camera, and confirmed the leak from the thief hatch with the

PID. Constantinos Loukeris recorded IR video MOV 1367, which depicts the leaks from the crude oil tank's thief hatch and relief valve.

- Constantinos Loukeris detected significant emissions leaks from two produced water tanks' thief hatches using the IR camera, and confirmed the leaks from the thief hatches with the PID. Constantinos Loukeris recorded IR videos MOV 1368 and MOV 1369, which depict the leaks from the two produced water tanks' thief hatches.

At the Prince K Pad:

- Constantinos Loukeris detected significant emissions leaks from two of the four produced water tanks' thief hatches, one was detected using the IR camera and confirmed with the PID, and one was detected with only the PID. Constantinos Loukeris recorded IR video MOV 1370, which depicts the leak from the thief hatch on one of the produced water tanks. Daniel Hoyt observed and noted visible staining around both produced water tank thief hatches.
- Constantinos Loukeris detected significant emissions leaks from six out of the eight crude oil tanks using the IR camera, including relief valve leaks from five of the crude oil tanks (confirming two with the PID), and thief hatch leaks from two of the crude oil tanks (confirming both with the PID). Constantinos Loukeris recorded IR videos MOV 1371, MOV 1372, MOV 1373, MOV 1374, MOV 1375 and MOV 1376 that depict the leaks from the crude oil tanks' relief valves and thief hatches. Daniel Hoyt observed and noted visible staining around one crude oil tank's relief valve and one crude oil tank's thief hatch.

During the morning of September 27, 2016, the EPA inspection team was accompanied by Charles Sholz, Chris Sanchez and Levi Poe, and performed in-depth facility tours and field emissions surveys at Valley Wells CPF, Valley Wells I Pad and Valley Wells J4 Pad. Ambient temperatures were around 70-75°F, the sky was overcast, and winds were northerly, 5-10 mph.

At the Valley Wells CPF:

- Constantinos Loukeris detected significant emissions leaks from seven out of the ten crude oil tanks using the IR camera, including thief hatch leaks from six of the crude oil tanks (confirming all six leaks with the PID), and one crude oil tank relief valve leak (also confirming it the PID). Constantinos Loukeris recorded IR videos MOV 1377, MOV 1378, MOV 1379, MOV 1380, MOV 1381, MOV 1382 and MOV 1383 that depict the leaks from the crude oil tanks' relief valve and thief hatches. Constantinos Loukeris detected thief hatch leaks using the PID from two of the three crude oil tanks that he detected no emissions from using the IR camera. Daniel Hoyt observed and noted visible staining around one crude oil tank's level sensor, thief hatch and relief valve, and around another crude oil tank's thief hatch.
- Constantinos Loukeris detected significant thief hatch emissions leaks from three out of the nine produced water and slop oil tanks using the IR camera (confirming all three leaks with the PID). Constantinos Loukeris recorded IR videos MOV 1384, MOV 1385 and MOV 1386 that depict the leaks from the produced water and slop oil tanks' thief hatches. Constantinos Loukeris detected thief hatch leaks using the PID from two of the three crude oil tanks that he detected no emissions from using the IR camera. Daniel Hoyt observed and noted a fresh slippery oil residue on and around the gunbarrel skim tank, and staining around three of the produced water and slop oil tanks' thief hatches.

- Constantinos Loukeris detected an emissions plume emanating from the flare with the IR camera. Constantinos Loukeris recorded IR video MOV 1387 that depicts the emissions emanating from the flare.

At the Valley Wells I Pad:

- Constantinos Loukeris detected significant emissions leaks from the thief hatches on all three crude oil tanks that were imaged using the IR camera (confirming all three leaks with the PID). Constantinos Loukeris recorded IR videos MOV 1390, MOV 1391 and MOV 1392 that depict the leaks from the crude oil tanks' thief hatches.
- Constantinos Loukeris detected significant thief hatch emissions leaks from both of the produced water tanks that were imaged using the IR camera (confirming both leaks with the PID). Constantinos Loukeris recorded IR videos MOV 1388 and MOV 1389 that depict the leaks from the produced water tanks' thief hatches.
- Constantinos Loukeris did not image three crude oil tanks and two produced water tanks with the IR camera because wasp nests were observed.
- Constantinos Loukeris detected an emissions plume emanating from the flare with the IR camera. Constantinos Loukeris recorded IR video MOV 1393 that depicts the emissions emanating from the flare.

At the Valley Well J4 Pad:

- Constantinos Loukeris detected significant emissions leaks using the IR camera from the thief hatches on three of the four crude oil tanks and the produced water tank (confirming all five thief hatch leaks with the PID), and from the relief valves on three of the four crude oil tanks (confirming all three relief valve leaks with the PID). Constantinos Loukeris recorded IR videos MOV 1394, MOV 1395, MOV 1396, MOV 1397, MOV 1398, MOV 1399 and MOV 1400 that depict the leaks from the crude oil and produced water tanks' thief hatches and the crude oil tanks' relief valves.
- Constantinos Loukeris detected a significant emissions leak from the pneumatic controller at the top of the low pressure flash separator column. Constantinos Loukeris recorded IR video MOV 1402 that depicts the leak from the pneumatic controller at the top of the low pressure flash separator column.

During the afternoon of September 27, 2016, the EPA inspection team was accompanied by Charles Sholz, Chris Sanchez and Levi Poe, and performed in-depth facility tours and field emissions surveys at Rogers D Pad, Rogers B Pad, Rogers C Pad and Snowmass A Pad. Ambient temperatures were around 75-80°F, the sky was overcast, and winds were northerly, 5-10 mph.

At the Rogers D Pad:

- Constantinos Loukeris detected significant emissions leaks from the four produced water tanks' thief hatches using the IR camera and confirmed each of them with the PID. Constantinos Loukeris recorded IR videos MOV 1403, MOV 1404, MOV 1419 and MOV 1420, which depict the leak from the thief hatch on the produced water tanks. Daniel Hoyt observed and noted visible staining/oily residue around one of the produced water tank's thief hatch.
- Constantinos Loukeris detected significant emissions leaks from all seven crude oil tanks using the IR camera, including thief hatch leaks from all seven of the crude oil tanks

(confirming each with the PID), and relief valve leaks from five of the crude oil tanks (confirming three with the PID). Constantinos Loukeris recorded IR videos MOV 1405, MOV 1406, MOV 1407, MOV 1409, MOV 1410, MOV 1411, MOV 1414, MOV 1415, MOV 1416, MOV 1417 and MOV 1418 that depict the leaks from the crude oil tanks' relief valves and thief hatches.

- Constantinos Loukeris detected significant emissions leaks from the relief valve and thief hatch on the slop oil tank using the IR camera (confirming the thief hatch leak with the PID). Constantinos Loukeris recorded IR videos MOV 1412 and MOV 1413 that depict the leaks from the slop oil tank's relief valve and thief hatch.
- Constantinos Loukeris detected significant emissions leaks from the relief valve and vacuum breaker on the vent line above a crude oil tank. Constantinos Loukeris recorded IR video MOV 1408, which depicts the leaks from the relief valve and vacuum breaker on the vent lines above the crude oil tank.

At the Rogers C Pad:

- Constantinos Loukeris detected significant emissions leaks from all four produced water tanks' thief hatches using the IR camera and confirmed each of them with the PID. Constantinos Loukeris recorded IR videos MOV 1421, MOV 1422, MOV 1433 and MOV 1434, which depict the leaks from the thief hatches on the produced water tanks.
- Constantinos Loukeris detected significant emissions leaks from seven of the eight crude oil tanks using the IR camera, including thief hatch leaks from five of the crude oil tanks (confirming each with the PID), and relief valve leaks from five of the crude oil tanks (confirming four with the PID). Constantinos Loukeris recorded IR videos MOV 1423, MOV 1424, MOV 1425, MOV 1426, MOV 1427, MOV 1428, MOV 1429, MOV 1430, MOV 1431 and MOV 1432 that depict the leaks from the crude oil tanks' relief valves and thief hatches. Daniel Hoyt observed and noted visible staining around piping from the low pressure flash separator column, at the top of one of the crude oil tanks.

At the Rogers B Pad:

- Constantinos Loukeris detected a significant emissions leak from the produced water tank's thief hatch using the IR camera and confirmed it with the PID. Constantinos Loukeris recorded IR videos MOV 1440, which depict the leak from the thief hatch on the produced water tank.
- Constantinos Loukeris detected significant emissions leaks from the thief hatches on all four crude oil tanks using the IR camera and confirmed each leak with the PID. Constantinos Loukeris recorded IR videos MOV 1435, MOV 1436, MOV 1437 and MOV 1438 that depict the crude oil tanks' thief hatch leaks.

At the Snowmass A Pad:

- Constantinos Loukeris detected a significant emissions leak from the produced water tank's thief hatch using the IR camera and confirmed it with the PID. Constantinos Loukeris recorded IR videos MOV 1448, which depict the leak from the thief hatch on the produced water tank.
- Constantinos Loukeris detected significant emissions leaks from the thief hatches on all four crude oil tanks using the IR camera and confirmed each leak with the PID. Constantinos Loukeris recorded IR videos MOV 1441, MOV 1442, MOV 1444 and MOV 1446 that depict

the crude oil tanks' thief hatch leaks. Daniel Hoyt observed and noted that two of the crude oil tanks had deformed tops. Constantinos Loukeris took visible light photograph DC 1447, which depicts one of the deformed crude oil tanks including ponding water in the deformation.

- Constantinos Loukeris detected a significant emissions leak from the relief valve on the vent line above and between two crude oil tanks. Constantinos Loukeris recorded IR video MOV 1445, which depicts the leak from the relief valve on the vent line above and between two crude oil tanks.
- Constantinos Loukeris detected an emissions plume emanating from the flare with the IR camera. Constantinos Loukeris recorded IR video MOV 1443 that depicts the emissions emanating from the flare.

During the morning of September 28, 2016, the EPA inspection team was accompanied by Charles Sholz, Chris Sanchez and Levi Poe, and performed in-depth facility tours and field emissions surveys at Garcia B Pad, Garcia A Pad and Rakowitz V Pad. Ambient temperatures were around 80-85°F, the sky was clear, and winds were calm to variable, 0-5 mph.

At the Garcia B Pad:

- Constantinos Loukeris imaged the eight crude oil tanks and two produced water tanks from ground level because this well pad's gas is sour. Constantinos Loukeris detected one or more significant emissions leaks from one or two crude oil tanks. Constantinos Loukeris recorded IR videos MOV 1449 and MOV 1450, which depict the leak or leaks from one or two of the crude oil tanks.
- Constantinos Loukeris detected a significant emissions leak from a manway or other piping at the base of the B6 heater treater. Constantinos Loukeris recorded IR video MOV 1453, which depicts the leak from a manway or other piping at the base of the B6 heater treater.
- Constantinos Loukeris detected an emissions plume emanating from the flare with the IR camera. Constantinos Loukeris recorded IR video MOV 1451, which depicts the emissions emanating from the flare, and visible image photograph DC 1452 showing that the flare did not have visible emissions (smoke) at the time of the photograph.

At the Garcia A Pad Constantinos Loukeris imaged the four crude oil tanks and one produced water tank from ground level because this well pad's gas is sour. Constantinos Loukeris detected a significant emissions leak from one of the crude oil tanks. Constantinos Loukeris recorded IR video MOV 1454, which depicts the plume from the leaking crude oil tank.

At the Rakowitz V Pad:

- Constantinos Loukeris detected significant emissions leaks from all four produced water tanks' thief hatches, three were detected using the IR camera and confirmed with the PID, and one was detected with just the PID because the focus on the IR camera had been inadvertently misadjusted. Constantinos Loukeris recorded IR videos MOV 1458, MOV 1459 and MOV 1475, which depict three of the leaks from the thief hatches on the produced water tanks.
- Constantinos Loukeris detected significant emissions leaks from all eight crude oil tanks using the IR camera, including thief hatch leaks from seven of the crude oil tanks (confirming each with the PID), and relief valve leaks from all eight of the crude oil tanks

(confirming each with the PID). Constantinos Loukeris recorded IR videos MOV 1460, MOV 1461, MOV 1462, MOV 1463, MOV 1464, MOV 1465, MOV 1466, MOV 1467, MOV 1468, MOV 1469, MOV 1470, MOV 1471, MOV 1472, MOV 1473 and MOV 1474 that depict the leaks from the crude oil tanks' relief valves and thief hatches. Daniel Hoyt observed and noted visible staining around the thief hatch on one of the crude oil tanks.

- Constantinos Loukeris detected an emissions leak on the pneumatic control valve for the heater treater's water dump using just the PID because the focus on the IR camera had been inadvertently misadjusted.

During the afternoon of September 28, 2016, the EPA inspection team was accompanied by Charles Sholz, Chris Sanchez and Levi Poe, and performed in-depth facility tours and field emissions surveys at J Tyler Las P Pad and Kinsel E Pad. Ambient temperatures were around 85-90°F, the sky had scattered clouds, and winds were northwesterly, around 5 mph.

At the J Tyler Las P Pad:

- Constantinos Loukeris detected an emissions plume emanating from the flare with the IR camera. Constantinos Loukeris recorded IR video MOV 1477 that depicts the emissions emanating from the flare.
- Constantinos Loukeris detected a significant emissions leak from a pneumatic control valve on the high pressure three-phase separator associated with Well I PH4 and confirmed the leak with the PID. Constantinos Loukeris recorded IR video MOV 1479, which depicts the leak from a pneumatic control valve on the high pressure three-phase separator associated with Well I PH4.
- Constantinos Loukeris detected significant emissions leaks from all four produced water tanks' thief hatches, three were detected using the IR camera and confirmed with the PID, and one was detected with only the PID. Constantinos Loukeris recorded IR videos MOV 1480, MOV 1481 and MOV 1482, which depict three of the leaks from the thief hatches on the produced water tanks. Daniel Hoyt observed and noted visible staining and droplets around the thief hatch on one of the produced water tanks.
- Constantinos Loukeris detected significant emissions leaks from all eight crude oil tanks using the IR camera, including thief hatch leaks from all eight of the crude oil tanks (confirming each with the PID), and relief valve leaks from all eight of the crude oil tanks (confirming each with the PID). Constantinos Loukeris recorded IR videos MOV 1483, MOV 1484, MOV 1485, MOV 1486, MOV 1487, MOV 1488, MOV 1489, MOV 1490, MOV 1491, MOV 1492, MOV 1493, MOV 1494, MOV 1495 and MOV 1496 that depict the leaks from the crude oil tanks' relief valves and thief hatches. Constantinos Loukeris noted that he detected crude oil odors around one of the crude oil tanks.

At the Kinsel E Pad:

- Constantinos Loukeris detected significant emissions leaks from all four produced water tanks' thief hatches using the IR camera and confirmed the leaks with the PID. Constantinos Loukeris recorded IR videos MOV 1497, MOV 1506, MOV 1507 and MOV 1516, which depict the leaks from the thief hatches on the produced water tanks.
- Constantinos Loukeris detected significant emissions leaks from the thief hatches on all sixteen crude oil tanks using the IR camera and confirmed each leak with the PID. Constantinos Loukeris recorded IR videos MOV 1498, MOV 1499, MOV 1500, MOV 1501,

MOV 1502, MOV 1503, MOV 1504, MOV 1505, MOV 1508, MOV 1509, MOV 1510, MOV 1511, MOV 1512, MOV 1513, MOV 1514 and MOV 1515 that depict the leaks from the crude oil tanks' thief hatches. Daniel Hoyt observed and noted visible staining around the thief hatches on three of the crude oil tanks.

- Constantinos Loukeris detected significant emissions leaks from the produced water and crude oil tanks using the IR camera from ground level. Constantinos Loukeris recorded IR video MOV 1517, which depicts three emissions plumes emanating from the tanks.
- Constantinos Loukeris detected an emissions plume emanating from the flare with the IR camera. Constantinos Loukeris recorded IR video MOV 1518 that depicts the emissions emanating from the flare.

During the morning of September 29, 2016, the EPA inspection team was accompanied by Charles Sholz, Vijay Kurki and Levi Poe, and performed in-depth facility tours and field emissions surveys at: JEA CPF, and JEA B Pad. The EPA inspection team also observed a pipeline pigging operation at a pig receiver on the morning of September 29, 2016, for a pipeline between JEA E 1H Pad and JEA CPF. Ambient temperatures were around 85-90°F, the sky had scattered clouds, and winds were northeasterly, around 5 mph.

At the JEA CPF:

- Constantinos Loukeris detected an emissions leak coming from the vertical liquid recovery line pressure regulator of the vapor recovery unit with the IR camera, confirmed the leak with the PID and recorded IR video MOV 1519, which depicts the emissions coming from the vapor recovery unit.
- Constantinos Loukeris detected emissions coming from a sump's J vent near the vapor recovery unit with the IR camera, confirmed the emissions with the PID and recorded IR video MOV 1520, which depicts the emissions coming from a sump's J vent near the vapor recovery unit.
- Constantinos Loukeris did not detect any significant emissions leaks from the six produced water tanks, the gunbarrel skim tank or the two slop oil tanks using the IR camera and the PID. Daniel Hoyt observed and noted that one of the slop oil tanks was deformed at the top and was missing white paint around the deformation.
- Constantinos Loukeris detected significant emissions leaks from six of the nine crude oil tanks using the IR camera, including three thief hatch leaks and five relief valve leaks, and confirmed each leak with the PID. Constantinos Loukeris recorded IR videos MOV 1521, MOV 1522, MOV 1523, MOV 1524, MOV 1525, MOV 1526, MOV 1527 and MOV 1528 that depict the leaks from the crude oil tanks' thief hatches and relief valves. Daniel Hoyt observed and noted visible staining around the thief hatches on two of the crude oil tanks and around the relief valve on another crude oil tank.

The EPA team observed a pipeline pigging operation along the JEA E 1H flow line, which flows from the JEA E Pad to the JEA CPF. Constantinos Loukeris detected emissions from the pigging operation and recorded IR video MOV 1530, which depicts the pipeline pigging emissions.

At the JEA B Pad:

- Constantinos Loukeris detected significant emissions leaks from three of the four produced water tanks' thief hatches using the IR camera and confirmed the leaks with the PID.

Constantinos Loukeris recorded IR videos MOV 1531, MOV 1532 and MOV 1547, which depict the leaks from the thief hatches on the produced water tanks.

- Constantinos Loukeris detected significant emissions leaks from all eight crude oil tanks using the IR camera, including eight PID confirmed thief hatch leaks and five relief valve leaks (one relief valve leak was confirmed with the PID). Constantinos Loukeris recorded IR videos MOV 1533, MOV 1534, MOV 1535, MOV 1536, MOV 1537, MOV 1538, MOV 1539, MOV 1540, MOV 1541, MOV 1542, MOV 1543, MOV 1544 and MOV 1545 that depict the leaks from the crude oil tanks' thief hatches and relief valves. Daniel Hoyt observed and noted visible staining around the thief hatches on two of the crude oil tanks.
- Constantinos Loukeris detected an emissions plume emanating from the flare with the IR camera. Constantinos Loukeris recorded IR video MOV 1546 that depicts the emissions emanating from the flare.

During the afternoon of September 29, 2016, the EPA inspection team was accompanied by Charles Sholz, Vijay Kurki and Levi Poe, and performed in-depth facility tours and field emissions surveys at: JEA A Pad, Shining Star CPF F Pad, Shining Star H Pad, and Shining Star I Pad. Ambient temperatures were around 90-95°F, the sky was clear, and winds were northeasterly, around 10 mph.

At the JEA A Pad Constantinos Loukeris imaged the eight crude oil tanks and four produced water tanks from ground level because wasp nests were observed. Constantinos Loukeris detected significant emissions leaks from two of the crude oil tanks and from the relief valve on the vent line above a crude oil tank. Constantinos Loukeris recorded IR videos MOV 1548 and MOV 1549, which depicts the plumes from the leaking crude oil tanks and vent line relief valve.

At the Shining Star CPF F Pad:

- Constantinos Loukeris detected an emissions leak from the vapor recovery unit outlet line gas regulator using the IR camera and confirmed the leak with the PID. Constantinos Loukeris recorded IR video MOV 1552, which depicts the vapor recovery unit leak, and took visible light photograph DC 1553 of the gas line out of the vapor recovery unit where the leak was detected.
- Constantinos Loukeris detected emissions leaks with the IR camera from the pneumatic control valves on four high pressure separators and confirmed the leaks with the PID. Constantinos Loukeris recorded IR videos, including MOV 1555, depicting the leaks from the water and oil dump pneumatic control valves on the well F2H separator, MOV 1554 depicting the leak from the water dump pneumatic control valve on the well F3H separator, MOV 1556 depicting the leak from the oil dump pneumatic control valve on the well F4H separator, MOV 1558 depicting the leaks from the oil and water dump pneumatic control valves on the separator for the wells not located on the F Pad, and MOV 1557 depicting the leak from the influent line pneumatic control valve on the separator for the wells not located on the F Pad.
- Constantinos Loukeris detected significant emissions leaks from two of the four produced water tanks' thief hatches using the IR camera and confirmed the leaks with the PID. Constantinos Loukeris recorded IR videos MOV 1559 and MOV 1577, which depict the leaks from the thief hatches on the produced water tanks. Daniel Hoyt observed and noted visible staining around the thief hatch on one of the produced water tanks.

- Constantinos Loukeris detected significant emissions leaks from all eight crude oil tanks. Constantinos Loukeris detected seven crude oil tank thief hatch leaks with the IR camera (confirming the thief hatch leaks with the PID), one crude oil tank thief hatch leak with just the PID, and eight crude oil tank relief valve leaks with the IR camera (confirming three of the relief valve leaks with the PID). Constantinos Loukeris recorded IR videos MOV 1560, MOV 1561, MOV 1562, MOV 1563, MOV 1566, MOV 1567, MOV 1568, MOV 1569, MOV 1570, MOV 1571, MOV 1572, MOV 1573, MOV 1574, MOV 1575 and MOV 1576 that depict the leaks from the crude oil tanks' thief hatches and relief valves. Daniel Hoyt observed and noted visible crude oil staining on five of the crude oil tanks including around the relief valves on five tanks, and the inlet/overflow piping from the low pressure flash separator column on two tanks and around the thief hatch on one crude oil tank.
- Constantinos Loukeris detected a significant emissions leak from the relief valve and vacuum breaker on the vent line above a crude oil tank. Constantinos Loukeris recorded IR video MOV 1564, which depicts the leak from the relief valve and vacuum breaker on the vent line above the crude oil tank. Daniel Hoyt observed and noted visible crude oil staining on two of the crude oil tanks from the relief valves on the vent lines above the crude oil tanks. Constantinos Loukeris took visible light photograph DC 1565, which depicts the staining on the crude oil tank below the leaking vent line relief valve.
- Constantinos Loukeris detected an emissions plume emanating from the flare with the IR camera. Constantinos Loukeris recorded IR video MOV 1578 that depicts the emissions emanating from the flare.

At the Shining Star H Pad:

- Constantinos Loukeris detected an emissions plume emanating from the flare with the IR camera. Constantinos Loukeris recorded IR video MOV 1579 that depicts the emissions emanating from the flare.
- Constantinos Loukeris detected an emissions leak from the produced water tank's thief hatch using the IR camera and confirmed the leak with the PID. Constantinos Loukeris recorded IR video MOV 1580, which depicts the leak from the thief hatch on the produced water tank. Daniel Hoyt observed and noted visible staining around piping connected at the top of the produced water tank.
- Constantinos Loukeris detected a significant emissions leak from the thief hatch on one of the four crude oil tanks and confirmed the thief hatch leak with the PID. Constantinos Loukeris recorded IR video MOV 1581 that depict the leak from the crude oil tank's thief hatch. Daniel Hoyt observed and noted that one crude oil tank was deformed and missing paint around the deformation, and two other crude oil tanks had visible crude oil staining, one around the piping inlet/overflow line from the low pressure flash separator column and the other around the thief hatch.

At the Shining Star I Pad:

- Constantinos Loukeris detected emissions leaks from both produced water tanks' thief hatches using the IR camera and confirmed the leaks with the PID. Constantinos Loukeris recorded IR videos MOV 1587 and MOV 1593, which depicts the leaks from the thief hatches on the produced water tanks.
- Constantinos Loukeris detected significant emissions leaks from the thief hatches on all eight of the crude oil tanks and confirmed the thief hatch leaks with the PID. Constantinos

Loukeris noted crude oil odors around two of the crude oil tanks and recorded IR videos MOV 1582, MOV 1584, MOV 1585, MOV 1586, MOV 1589, MOV 1590, MOV 1591 and MOV 1592, which depict the leaks from the crude oil tanks' thief hatches. Daniel Hoyt observed and noted that two crude oil tanks had visible crude oil staining around the piping inlet/overflow line from the low pressure flash separator column, and two of the crude oil tanks had staining around the thief hatch.

- Constantinos Loukeris detected significant emissions leaks from both relief valves on the vent lines leading to the flare. Constantinos Loukeris recorded IR videos MOV 1583 and MOV 1588, which depict the leaks from the relief valves on the vent lines leading to the flare.
- Constantinos Loukeris detected an emissions plume emanating from the flare with the IR camera. Constantinos Loukeris recorded IR video MOV 1594, which depicts the emissions emanating from the flare, and visible image photograph DC 1595 showing that the flare did not have visible emissions (smoke) at the time of the photograph.

SECTION 4 – EXIT MEETING

The EPA inspection team arrived at the offices of the Chesapeake located at 4350 Lockhill Selma Road, Suite 250, Shavano Park, TX 78249 at 1:00 pm on September 30, 2016, for an exit meeting. Constantinos Loukeris provided Vijay Kurki with copies of all photographic images he took and all videos that he recorded during the site visits. Vijay Kurki provided Daniel Hoyt with permit document application representations and approval letters from TCEQ for all of the sites visited, which includes CBI (see Attachment 1). Vijay Kurki also provided Daniel Hoyt with the Facility Emissions Event Record for the release at the Prince M Pad CPF described above (see Attachment 5). During the exit meeting Daniel Hoyt identified concerns regarding leaks and emission releases from tanks and other equipment, and emissions from flares, noted above for the visited sites. Constantinos Loukeris requested for Chesapeake to provide documentation of any corrective actions taken by Chesapeake, for any of the observations noted during the site visits. Daniel Hoyt asked for additional information regarding the calculations and reportable quantity analysis for the release at the Prince M Pad CPF described above.

ATTACHMENTS

1. Chesapeake's PBR and standard permit applications and approval letters from TCEQ (includes CBI), recorded on a CD
2. Photo log – 43 pictures taken
3. Master log of inspection data and observations
4. Videos and photographs from the site visits, recorded on a CD
5. Facility Emissions Event Record for the September 26, 2016 release at the Prince MCM M Pad CPF